

Penn Cambria Curriculum

Course Name	MS Algebra 8
Length of Course	1 year (one period per day)
Grade Level	8
Prerequisites	Middle School Pre-Algebra
Course Description	Middle School Algebra 8 is designed to provide students with a solid foundation in Algebraic Concepts and basic Algebra to prepare them for high school level algebra courses. Students will also learn concepts of numbers and operations, measurement, geometry and data analysis and probability as defined by the PA Academic Standards.
Units of Study	Introduction to Algebra Working with Real Numbers Solving Equations Coordinates, Graphs and Tables Slopes Inequalities Measurement Geometry Percents Probability and Statistics Polynomials Factoring Polynomials Systems of Linear Equations
Materials	Text: <u>Algebra Structure and Method Book 1</u> - Brown and Dolciani c2000 Supplemental Materials: Assessment Anchor specific materials, teacher created materials

Unit 1: Review & Intro to Algebra

Estimated Time: 3 – 4 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. C – Distinguish between and order rational and irrational numbers.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.1.8. F – Use the number line model to demonstrate integers and their applications.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.

- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.8.8. F – Solve and graph equations and inequalities using scientific and graphing calculators and computers spreadsheets.
- 2.8.8. G – Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.

Curricular Objectives:

Students will:

- A. Positive and Negative signed numbers
 - a. Find the sum, difference, product, or quotient of positive and negative numbers
- B. Order of Operations
 - a. Evaluate expressions following the order of operations
 - b. Fill in missing blanks to complete order of operations
- C. Variables
 - a. Simplify expressions
 - b. Evaluate expressions by substitution
- D. Grouping symbols
 - a. Evaluate expressions with more than one grouping symbol
- E. Introduction to Equations
 - a. Use charts with a specified domain to find solutions to equations
- F. Key Phrases and Translations
 - a. Translate word phrases into algebraic expressions
- G. Number Lines
 - a. Order real numbers on a number line
- H. Opposites and Absolute Value
 - a. Evaluate expressions involving absolute value
 - b. Simplify expressions involving absolute value

Assessments/ Measurement of Objectives:

- Signed numbers and Order of Operations Quiz
- Expressions and Equations quiz
- Vocabulary quiz
- Intro to Algebra test
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Signed number worksheets
- Order of Operations Cooperative Group “Square” puzzle
- Order of Operations Open-ended problems—Done as a large group
- Grouping Symbol Open-ended question
- Oral review
- Substitution Cooperative group “square” puzzle
- Grouping Symbols challenge problem—done in small groups

Unit 2: Working with Real Numbers

Estimated Time: 3 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. C – Distinguish between and order rational and irrational numbers.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.4.8. D – Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.

Curricular Objectives:

Students will:

- A. Combining like terms
 - a. Simplify expressions involving like terms
- B. Distributive Property
 - a. Simplify expressions involving the distributive property
- C. Reciprocal of a real number
 - a. Find the reciprocal of a number
 - b. Simplify expressions involving fractions
- D. Dividing Real Numbers
 - a. Know when to apply the reciprocal of a number
 - b. Divide integers, variables, and fractions

Assessments/ Measurement of Objectives:

- Simplifying quiz w/ Open-ended question
- Real numbers test w/ Open-ended question
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Practice simplifying worksheet
- Consecutive integers worksheet
- Fractions packet worksheet
- Review game

Unit 3: Solving Equations

Estimated Time: 3 – 4 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.4.8. A – Make conjectures based on logical reasoning and test conjectures by using counter-examples.
- 2.4.8. B – Combine numeric relationships to arrive at a conclusion.
- 2.4.8. D – Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.
- 2.4.8. E – Distinguish between inductive and deductive reasoning.
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.

Curricular Objectives:

Students will:

- A. Addition & Subtraction Equations (pt 1)
 - a. Isolate the variable in an addition and subtraction equation
 - b. Use inverse operations to isolate a variable
- B. Addition & Subtraction Equations (pt 2)
 - a. Isolate a variable in an addition and subtraction equation
 - b. Solve equations involving absolute value
 - c. Use inverse operations to isolate a variable
 - d. Pick and label a variable to write an equation in a word problem; solve the equation
- C. Multiplication & Division Equations
 - a. Isolate variable in multiplication and division equation
 - b. Use inverse operations to isolate a variable
 - c. Pick and label a variable to write an equation in a word problem; solve the equation
- D. Solving Equations with several transformations (2 or more steps)
 - a. Simplify equations before solving
 - b. Apply PEMDAS in reverse to solve multiple step equations
- E. Equations with variables on both sides
 - a. Gather the variable on one side of the equation using the inverse operations
- F. Using charts to organize word problems involving equations
 - a. Fill in the missing information on a chart to find the solution to a word problem
 - b. Create a chart to match a word problem situation
- G. Consecutive integers

- a. Write variable expressions to correspond to consecutive integer word problems
- b. Apply the 5-step word problem method to consecutive integer problems

Assessments/ Measurement of Objectives:

- One-step equation quiz
- Equation test
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Equation bingo
- One-step equation study guide
- Word problem open-ended
- Equation “square” puzzle in cooperative groups
- Equation BINGO race challenge
- Equation riddles—done as a large group
- Word problems using charts—completed as a large group (discussion)

Unit 4: Coordinates, Graphs and Tables

Estimated Time: 2 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.8.8. A – Apply simple algebraic patterns to basic number theory and to spatial relations.
- 2.8.8. B – Discover, describe and generalize patterns, including linear, exponential and simple quadratic relationship.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.8.8. G – Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.
- 2.8.8. H – Graph a linear function from a rule or table.
- 2.8.8. J – Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.
- 2.11.8.C – Continue a pattern of numbers or objects that could be extended infinitely.

Curricular Objectives:

Students will:

- A. Plotting, checking solutions, graphing
 - a. Plot points on a coordinate plane
 - b. Find points on a coordinate plane
 - c. Check solutions to a 2-variable equation
 - d. Graph equations using a T-chart
 - e. Complete rectangles and parallelograms
- B. Graph, equations, table matching
 - a. Match tables to the correct equations
 - b. Match graphs to the correct equation
 - c. Match equations to correct graph
 - d. Match tables to correct graph
 - e. Match graphs to the correct table
 - f. Match equations to the correct table
 - g. Find a solution to an equation without knowing how to solve it (multiple choice)
- C. Algebraic patterns
 - a. Fill in the missing number(s) in a pattern
 - b. Fill in missing number in a table
 - c. Find the rule for a given table

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Blackboard and graph board work
- Question/answer session
- Worksheet on matching tables, graphs, equations
- Open-ended question on completing polygons
- Open-ended question on graphing and matching
- Group work pre-test activity

Unit 5: Slopes

Estimated Time: 4 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.4.8. E – Distinguish between inductive and deductive reasoning.
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.8.8. G – Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.
- 2.8.8. H – Graph a linear function from a rule or table.
- 2.8.8. I – Generate a table or graph from a function and use graphing calculators and computer spreadsheets to graph and analyze functions.
- 2.8.8. J – Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.
- 2.9.8. A – Construct figures incorporating perpendicular and parallel lines, the perpendicular bisector of a line segment and an angle bisector using computer software.
- 2.9.8. E – Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles).
- 2.11.8.B – Describe the concept of unit rate, ratio and slope in the context of rate of change.

Curricular Objectives:

Students will:

- A. Writing equations in $y = mx + b$ form
 - a. Transform equations into slope-intercept form
 - b. Label slope and y-intercept given equation
- B. Finding slope given graph
 - a. Use “rise over run” to find slope
 - b. Distinguish between positive/negative slope
 - c. Explain characteristics of horizontal lines and their slopes
 - d. Explain vertical lines having “no slope”
- C. Finding slope of line given 2 points
 - a. Use change of y’s over change of x’s
- D. Parallel and perpendicular lines
 - a. Identify properties of parallel lines
 - b. Identify properties of perpendicular lines
- E. Finding intercepts
 - a. Find intercepts given an equation

- F. Graphing equations
 - a. Graph an equation using “b” and “m”
 - b. Graph an equation given a slope and point
- G. Writing equations given m and b or slope and point
 - a. Write an equation given “m” and “b”
 - b. Write an equation given “m” and a point
- H. Writing Equations given 2 points
 - a. Write an equation given 2 points
 - b. Write an equation given intercepts
 - c. Write an equation given specific information
- I. Writing equations given graph
 - a. Use a graph to write an equation
- J. Functions
 - a. Determine whether a graph is a function
 - b. Determine whether a table represents a function
 - c. Determine whether coordinates are a function
 - d. Use function notation to substitute

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Blackboard and graph board work
- Question/answer session
- Worksheets on finding slope
- Intercepts (pre-lesson intro) packet
- Writing equations packet
- Study guide for chapter test

Unit 6: Inequalities

Estimated Time: 1 week

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. F – Use the number line model to demonstrate integers and their applications.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.2.8. F – Identify the difference between exact value and approximation and determine which is appropriate for a given situation.
- 2.4.8. C – Measure angles in degrees and determine relations of angles.
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.8.8. F – Solve and graph equations and inequalities using scientific and graphing calculators and computer spreadsheet

Curricular Objectives:

Students will:

- A. Labeling and graphing inequalities
 - a. Distinguish between open/closed circles
 - b. Write inequalities given the graph
 - c. Match inequalities to their graph
 - d. Graph inequalities that are already solved
 - e. Rewrite inequalities with variable first
- B. Solving and graphing inequalities
 - a. Solve inequalities using inverse operations
 - b. Determine when symbol changes directions
 - c. Solve and graph inequalities

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Blackboard work
- Question/answer session
- Worksheets on matching inequalities
- Review game
- Inequality open-ended (solving)

Unit 7: Measurement

Estimated Time: 3 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. D – Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.2.8. C – Estimate the value of irrational numbers.
- 2.2.8. E – Determine the appropriateness of overestimating or underestimating in computation.
- 2.2.8. F – Identify the difference between exact value and approximation and determine which is appropriate for a given situation.
- 2.3.8. A – Develop formulas and procedures for determining measurements (e.g., area, volume, distance).
- 2.3.8. B – Solve rate problems (e.g., rate x time = distance, principal x interest rate = interest).
- 2.3.8. D – Estimate, use and describe measures of distance, rate, perimeter, area, volume, weight, mass and angles.
- 2.3.8. E – Describe how a change in linear dimension of an object affects its perimeter, area and volume.
- 2.4.8. B – Combine numeric relationships to arrive at a conclusion.
- 2.4.8. C – Measure angles in degrees and determine relations of angles.
- 2.4.8. D – Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.
- 2.4.8. E – Distinguish between inductive and deductive reasoning.
- 2.4.8. F – Use measurements and statistics to quantify issues (e.g., in family, consumer science situations).
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.8.8. J – Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.
- 2.9.8. D – Identify, name, draw and list all properties of squares, cubes, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, spheres, triangles, prisms and cylinders.
- 2.9.8. H – Use simple geometric figures (e.g., triangles, squares) to create, through rotation, transformational figures in three dimensions.
- 2.10.8.A – Compute measures of sides and angles using proportions, the Pythagorean Theorem and right triangle relationships.
- 2.10.8.B – Solve problems requiring indirect measurements for lengths of sides of triangles.

Curricular Objectives:

Students will:

- A. Metric, customary, temperature
 - a. Identify metric measures (“King Henry died drinking Chocolate Milk”)

- b. Use the fence method to cancel units
 - c. Determine which temperature formula to use
- B. Perimeter, circumference, area
 - a. Find the perimeter of polygons
 - b. Find the circumference of circles
 - c. Find the area of polygons and circles
- C. Surface area and volume
 - a. Find the surface area of rectangular prisms
 - b. Find the volume of rectangular prisms
 - c. Distinguish between prisms and pyramids
 - d. Discuss the faces on prisms/pyramids
 - e. Name 3-D shapes
 - f. Count the faces on 3-D shapes
 - g. Determine the 3-D shape based on the net
 - h. Draw nets for 3-D shapes
 - i. Determine the concept used for a situation
- D. Pythagorean theorem
 - a. Identify properties of right triangles
 - b. Determine when to use the Pythagorean theorem
 - c. Use Pythagorean theorem to find missing sides
- E. $D = rt$
 - a. Solve word problems involving $d = rt$
 - b. Determine the correct units on the answer
- F. Scientific notation
 - a. Explain the purpose of scientific notation
 - b. Change scientific notation to standard form
 - c. Change standard form into scientific notation
 - d. Check answers using calculator
- G. Estimation
 - a. Determine when it's appropriate to estimate
 - b. Determine over/under estimation
 - c. Solve story problems involving estimation

Assessments/ Measurement of Objectives:

- Cooperative Group Challenge Quiz
- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Active participation in notes • Blackboard work • Question/answer session • Conversions packet • Perimeter, circumference, area packet • Worksheet on volume and surface area • Surface area open-ended w/conversions • Volume open-ended w/ conversions • Scale drawing open-ended • Perimeter, circumference, area, surface area, volume study guide • Review session | <ul style="list-style-type: none"> • Book practice problems on Pythagorean theorem • Worksheet on Pythagorean theorem • Open-ended on Pythagorean theorem • Large group open-ended (area/perimeter) • Worksheet ($d = rt$) • Scientific notation worksheet • Measurement study guide • Open-ended practice (irregular shape area) • Open-ended practice (irregular shape perimeter) |
|---|---|

Unit 8: Geometry

Estimated Time: 2 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. D – Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.3.8. A – Develop formulas and procedures for determining measurements (e.g., area, volume, distance).
- 2.3.8. C – Measure angles in degrees and determine relations of angles.
- 2.8.8. C – Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8. D – Use concrete objects to model algebraic concepts.
- 2.8.8. E – Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.
- 2.9.8. A – Construct figures incorporating perpendicular and parallel lines, the perpendicular bisector of a line segment and an angle bisector using computer software.
- 2.9.8. B – Draw, label, measure and list the properties of complementary, supplementary and vertical angles.
- 2.9.8. C – Classify familiar polygons as regular or irregular up to a decagon.
- 2.9.8. D – Identify, name, draw and list all properties of squares, cubes, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, spheres, triangles, prisms and cylinders.
- 2.9.8. E – Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles).
- 2.9.8. F – Distinguish between similar and congruent polygons.
- 2.10.8.B - Solve problems requiring indirect measurements for lengths of sides of triangles.

Curricular Objectives:

Students will:

- A. Points, lines, planes, and angles
 - a. Define and use vocabulary related to points, lines, planes and angles
 - b. Provide physical examples of points, lines, planes and angles
 - c. Explain the connection between points, lines, planes and angles
- B. Parallel and perpendicular lines
 - a. Identify acute and obtuse angles
 - b. Identify alternate interior angles
 - c. Identify alternate exterior angles
 - d. Identify corresponding angles
 - e. Pick out angles in figure
 - f. Find missing angles in figure
- C. Triangles
 - a. Use the triangle sum theorem
 - b. Compare and contrast the different types of triangles
 - c. Find missing angles of triangles
 - d. Identify the properties of different triangles
- D. Polygons
 - a. Identify polygons up to 10 sides
 - b. Organize the different properties of polygons

- c. Find the angle sum of polygons
- d. Find an interior angle of a regular polygon
- e. Classify polygons
- f. Name polygons
- E. Similar polygons
 - a. Explain properties of similar figures
 - b. Demonstrate how to set up proportions
 - c. Solve proportions by cross multiplying
 - d. Find missing sides of similar figures
 - e. Find missing angles of similar figures

Assessments/ Measurement of Objectives:

- Open-ended test
- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Blackboard work
- Question/answer session
- Open-ended geometry problems
- Vocabulary crossword puzzle
- Vocabulary matching
- Word wall reference
- Practice packets for each section
- Test review
- Test study guides

Unit 9: Percents

Estimated Time: 2 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. D – Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.2.8. D – Estimate amount of tips and discounts using ratios, proportions and percents.
- 2.2.8. E – Determine the appropriateness of overestimating or underestimating in computation.
- 2.2.8. F – Identify the difference between exact value and approximation and determine which is appropriate for a given situation.
- 2.3.8. B – Solve rate problems (e.g., rate x time = distance, principal x interest rate = interest).
- 2.4.8. B – Combine numeric relationships to arrive at a conclusion.
- 2.4.8. C – Measure angles in degrees and determine relations of angles.
- 2.4.8. D – Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.
- 2.4.8. E – Distinguish between inductive and deductive reasoning.
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.7.8. B – Present the results of an experiment using visual representations (e.g., tables, charts, graphs).
- 2.7.8. C – Draw and justify a conclusion regarding the validity of a probability or statistical argument.
- 2.7.8. E – Solve problems involving independent simple and compound events.

Curricular Objectives:

Students will:

- A. Fractions, Decimals, Percents
 - a. Convert between equivalent forms
 - b. Write percents in two different ways
- B. Percent equations & finding percents
 - a. Change “is” and “of” into symbols
 - b. Solve percent equations
 - c. Calculate percent given a story problem
 - d. Use percent to answer word problems
- C. Ratios, Proportions, Unit Price
 - a. Check proportions
 - b. Write ratios
 - c. Write and solve proportions
 - d. Explain and calculate unit price
 - e. Find the better buy
- D. Tax, Tip, Discount, Interest
 - a. Calculate tip and tax

- b. Calculate percent discount
 - c. Find the final price after discount or tax
 - d. Calculate interest, rate, principal and time
- E. Estimating percents & data analysis
 - a. Find tip or discount without a calculator
 - b. Solve proportions given a survey sample
 - c. Use pie charts to answer percent questions

Assessments/ Measurement of Objectives:

- Open-ended test
- No calculator test
- Calculator test
- Objective quizzes and tests
- Classroom and homework exercises
-

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Blackboard work
- Question/answer session
- Open-ended percent problems
- Word wall reference
- No calculator practice packet
- Calculator practice packet
- Test review

Unit 10: Probability and Statistics

Estimated Time: 2 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. G – Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.
- 2.2.8. A – Complete calculations by applying the order of operations.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.5.8. A – Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8. B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8. C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8. D – Determine pertinent information in problem situations and whether any further information is needed for solution.
- 2.6.8. A – Compare and contrast different plots of data using values of mean, median, mode, quartiles and range.
- 2.6.8. B – Explain effects of sampling procedures and missing or incorrect information on reliability.
- 2.6.8. C – Fit a line to the scatter plot of two quantities and describe any correlation of the variables.
- 2.6.8. D – Design and carry out a random sampling procedure.
- 2.6.8. E – Analyze and display data in stem-and-leaf and box-and whisker plots.
- 2.7.8. A – Determine the number of combinations and permutations for an event.
- 2.7.8. B – Present the results of an experiment using visual representations (e.g., tables, charts, graphs).
- 2.7.8. C – Draw and justify a conclusion regarding the validity of a probability or statistical argument.
- 2.7.8. D – Compare and contrast results from observations and mathematical models.
- 2.7.8. E – Solve problems involving independent simple and compound events.

Curricular Objectives:

Students will:

- A. Stem and leaf & box and whisker
 - a. Answer questions about a stem/leaf plot
 - b. Calculate mean, median and mode
 - c. Find the quartiles given a set of data
 - d. Determine if there is an outlier in a data set
 - e. Find the range
 - f. Find the maximum and minimum values
 - g. Make a stem and leaf plot
 - h. Make a box and whisker plot
 - i. Interpret data from a box/whisker plot
- B. Scatter plots
 - a. Determine the correlation given a plot
 - b. Determine whether plot is strong or weak
 - c. Tell whether situation is positive or negative
- C. Choosing the best graph
 - a. Determine which graph is best for a given situation
- D. Probability
 - a. Write probability as a fraction
 - b. Explain “odds”
 - c. Find probability of an event not occurring
 - d. Find the number of possibilities
 - e. Calculate simulations

- E. Permutations and combinations
 - a. Determine if order does or doesn't matter
 - b. Calculate # of possible parking passes
 - c. Calculate number of combinations
 - d. Calculate number of permutations
 - e. List the different possible combinations

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Open-ended arrangement problems
- Open-ended combinations problems
- Question/answer sessions
- Statistics review worksheet

Unit 11: Polynomials

Estimated Time: 3 – 4 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.

Curricular Objectives:

Students will:

- A. Mult monomial & Power of monomials
 - a. Find products of power
 - b. Find power of power
 - c. Find power of a product
 - d. Simplify expressions involving exponents
- B. Multiplying polynomials by monomials
 - a. Distribute monomials
 - b. Simplify expressions
 - c. Solve equations w/distributing and simplifying
- C. Multiplying polynomials
 - a. Use the FOIL method
 - b. Simplify expressions
- D. Transforming formulas
 - a. Solve formulas for certain variables

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Question and answer sessions
- Introduction to polynomials worksheet
- Puzzle practice sheets
- Polynomial test review

Unit 12: Factoring Polynomials

Estimated Time: 4 weeks

Standard Alignment:

- 2.1.8. A – Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
- 2.1.8. B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8. E – Simplify and expand algebraic expressions using exponential forms.
- 2.2.8. B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.

Curricular Objectives:

Students will:

- A. Dividing monomials
 - a. Reduce numbers and variables
 - b. Simplify fractions
 - c. Apply exponent rules when dividing
- B. Monomial factors of polynomials
 - a. Find the missing value when factoring
 - b. Find the GCF of a polynomial
 - c. Factor by reversing the distributive property
- C. Difference of two squares
 - a. FOIL to find the product
 - b. Factor a polynomial into the difference of squares
 - c. Factor completely (GCF and difference of square)
- D. Monomial factors of polynomials
 - a. Factor polynomial in 2 sets of parentheses
 - b. Exhaust all factoring possibilities
- E. Factoring patterns
 - a. Factor polynomial in 2 sets of parentheses
 - b. Exhaust all factoring possibilities
 - c. Use factors of numbers to help factor

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Active participation in notes
- Question/answer sessions
- Puzzle practice sheets
- Factoring test review (index cards)

Unit 13: Systems of Linear Equations

Estimated Time: 2-4 weeks (time permitting)

Standard Alignment:

- 2.1.8 A – Represent and use numbers in equivalent forms.
- 2.1.8 B – Simplify numerical expressions involving exponents, scientific notation and using order of operations.
- 2.1.8 G – Use inverse relationships between addition, subtraction, multiplication, division, exponential and root extraction to determine unknown quantities in equations.
- 2.2.8 A – Complete calculations by applying the order of operations.
- 2.2.8 B – Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
- 2.5.8 A – Invert, select, use and justify the appropriate methods, materials and strategies to solve problems.
- 2.5.8 B – Verify and interpret results using precise mathematical language, notation, representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.
- 2.5.8 C – Justify strategies and defend approaches used and conclusions reached.
- 2.5.8 D – Determine pertinent information in problem solving situations and whether any further information is needed for solution.
- 2.8.8 B - Discover, describe and generalize patterns, including linear, exponential and simple quadratic relationships.
- 2.8.8 C - Create and interpret expressions, equations or inequalities that model problem situations.
- 2.8.8 E -
- 2.8.8 G - Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.
- 2.8.8 H - Graph a linear function from a rule or table.

Curricular Objectives:

Students will:

- A. Review on $y = mx + b$ form
 - a. Write equations in $y = mx + b$ form
 - b. Label slope and y – intercept
- B. Solving systems by graphing
 - a. Graph equations in $y = mx + b$ form
 - b. Find the solution to a system by graphing
 - c. Identify no solution systems
 - d. Explain infinitely many systems
- C. Solving systems by substitution
 - a. Solve equations for a variable
 - b. Identify when to use substitution
 - c. Identify no solution systems
 - d. Explain infinitely many solution systems
- D. Solving systems by elimination
 - a. Write equations so that the variables line up
 - b. Determine whether to add or subtract the equations
 - c. Add or subtract to cancel out a variable
 - d. Determine when to use elimination
 - e. Identify no solution systems
 - f. Explain infinitely many solution systems
- E. Solving systems by elimination (mult.)
 - a. Decide what number(s) to multiply
 - b. Decide whether to add or subtract
- F. Writing and solving systems
 - a. Pick two variables

- b. Translate phrases into math symbols
- c. Decide which method of solving is best
- d. Find the missing variables

Assessments/ Measurement of Objectives:

- Objective quizzes and tests
- Classroom and homework exercises

Suggested Methods of Instruction / Learning Activities:

- Review worksheet on $y = mx + b$ form
- Graphing practice worksheet
- Graphing book problems
- Thorough notes and lecture sessions
- Blackboard and graph board practice
- Large group word problems practice
- Question/answer sessions
- Verifying solutions worksheet
- Group work crossword puzzle
- Systems study guide
- Review session—test practice